STATE OF NEVADA
Jim Gibbons, Governor
Department of Conservation & Natural Resources
Allen Biaggi, Director
DIVISION OF ENVIRONMENTAL PROTECTION
Leo M. Drozdoff, P.E., Administrator

May 5, 2008

NOTICE OF DECISION

Water Pollution Control Permit
Number NEV0095114

Barrick Goldstrike Mines Inc.

Boulder Valley Recirculation Project

The Nevada Division of Environmental Protection (Division) has decided to approve issuance of Water Pollution Control Permit NEV0095114, to Barrick Goldstrike Mines Inc. for the Boulder Valley Recirculation Project. This permit authorizes the construction, operation, and closure of approved recirculation and infiltration facilities in Eureka County. The Division has been provided with sufficient information, in accordance with Nevada Administrative Code (NAC) 445A.350 through NAC 445A.447, to assure that the groundwater quality will not be degraded by this operation, and that public safety and health will be protected.

The modified permit will become effective May 20, 2008. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to Nevada Revised Statute (NRS) 445A.605 and NAC 445A.407. All requests for appeals must be filed by 5:00 PM, May 20, 2008, on Form 3, with the State Environmental Commission, 901 S. Stewart Street, Room 4001, Carson City, Nevada 897016-5249. For more information, contact Paul Eckert directly at (775) 687-9401, toll free in Nevada at (800) 992-0900, extension 4670, or visit the Division website at: http://ndep.nv.gov/bmrr/bmrr01.htm.

One comment letter was received during the public comment period. The comment letter, dated April 3, 2008, was received from Tom Myers, a hydrological consultant representing Great Basin Resource Watch. Division responses to the received comment, and the revised Fact Sheet, are attached to this Notice of Decision.

NDEP Response to Great Basin Resource Watch (GBRW) Comment Letter dated April 3, 2008.

Comment 1: "The fact sheet indicates there are two permits for the infiltration system in Boulder Valley: the one being considered here for the Recirculation system and one for the Infiltration system. It would be more efficient to combine these permits, especially if the fact sheet is correct in that the recirculation project includes, in addition to conveyance systems, treatment plants, and TS Ranch Reservoir, the infiltration basins (Fact Sheet, page 3)."

NDEP Response: Although the two systems share some components, the primary function of the Infiltration Permit (NEV0089068) is the reintroduction of the waters to the local aquifer, while the Recirculation Permit is concerned with the treatment of the water for As and the seasonal pumpback to the TS Ranch Reservoir. While the consolidation of these permits may be pursued at some future time, the Division is presently not considering this course of action.

Comment 2: "The method of actually capturing the flow is not described as it should be; is it seepage into the canal or a ditch from the springs to the canal or shallow wells?"

NDEP Response: The spring outflow and all meteoric runoff in this catchment basin flow on the surface and are collected in the Sand Dune Canal. This point has been clarified in the final edit of the Fact Sheet.

Comment 3: "A primary concern with the infiltration through the reservoir bottom and secondary recharge of the water discharging from the springs is whether it would leach As or other contaminants into the Boulder Flat basin fill aquifer and whether the mound the recharge creates will cause discharge into the Humboldt River."

NDEP Response: The review describes the dimensions of the groundwater mound in Boulder Valley and points out that not all of the water infiltrated into the TS Ranch Reservoir discharges at the springs. The Boulder Valley water balance and the size/destination/impacts of the groundwater mound are presented in detail by BLM in "Cumulative Impacts" (BLM, April 2000) and "Betze/Post Impacts" (BLM, January 2003).

Observations and simulation results indicate that the groundwater mound does not and will not discharge into the Humboldt River. Maurer et al (1996) and Berger (2000) characterize Boulder Flat and the Clovers area as large evapotranspiration (ET) sinks and characterize the Humboldt as a losing stream over this reach. Prudic et al. (2004, p27) also conclude that, downstream of the gage at Palisades, annual flow in the Humboldt River decreases, partially as a result of infiltration into the underlying alluvial aquifer. Groundwater modeling results indicate that the groundwater mound in Boulder Valley discharges either as ET in Boulder Flat or as groundwater flow to the Clovers area, then as ET in Clovers. The groundwater mound, attenuated by increased ET, is insufficient to reverse the local gradient and push water into the Humboldt. This is evidenced on Figure 1 of the review, showing no groundwater rise in the monitoring wells of lower Boulder Flat.

Barrick operates two As treatment plants in Boulder Valley: one for mine excess water and one for Sand Dune Canal water. Mine water is continuously pre-treated for As (< 0.05 ppm) before delivery to the TS Ranch Reservoir. Since the mine water is pre-treated, it does not flush an As load to the groundwater system. The "spike" of 0.13 mg/l As measured at Green Spring in first quarter, 2004 has not been repeated and appears to be an anomaly.

In the non-irrigation season, canal water is sampled daily and analyzed for As at the mine lab. If As exceeds 0.05 ppm, treatment commences. The three springs (Knob, Green and Sand Dune) are sampled, at their initial discharge points, twice a year for Profile I constituents (in both irrigation and non-irrigation seasons). All spring flow and surface water runoff in the upper catchment are collected in the Sand Dune Canal. No surface water from the springs bypass the canal. Flow in the canal is recorded using a flume-datalogger unit and a telemetry system.

Comment 4: "(apparently the reason for capturing the spring flow is to prevent a discharge to the river which would require a discharge permit)."

NDEP Response: The purpose of the permit is to manage the infiltration of the spring flows and provide an opportunity for treatment if necessary.

Comment 5: "In any case, the water budget parameters disagree with those calculated by Maurer et al (1996). The Humboldt River does not discharge 25,000 af/y into Boulder Flat. Maurer et al (1996) calculated zero discharge to the river and 12,000 af/y subsurface outflow from the valley to the Clovers area. They also indicate there is 51,000 af/y of ET discharge, not the amount indicated in the fact sheet, although the rising groundwater table probably has increased the phreatophyte area."

NDEP Response: It is generally recognized (McDonald Morrissey Associates, 1998) that the Humboldt River discharges substantial quantities of water to Boulder Flat. Maurer et. al. (1996, p46) estimate that the Humboldt loses 40,000 af/y over the Boulder Flat reach. In addition, Berger (2000, p1) estimates that the river loses 50,000 af/y over the Middle Humboldt basin, the major part of which is the Boulder Flat reach. Assuming that a portion of the river loss flows to the sub-basins south of the Humboldt, the model estimate of 25,000 af/y of Humboldt discharge to the sub-basins north of the river (Boulder Flat) seems to be in agreement with both USGS studies.

The review correctly asserts that Maurer et al (1996) estimate ET from Boulder Flat at 51,000 af/y, ground-water outflow to the Clovers area at 12,000 af/y and ground-water discharge to the Humboldt at 0 af/y. The Barrick model, by comparison, estimates (pre-mining) Boulder Flat ET at 66,000 af/y and ground-water outflow to the Clovers area at 7,000 af/y. The model estimates are in reasonable agreement with Maurer et. al. (1996) and with Berger (2000) who estimates ET of 66,000 af/y (Table 5) and groundwater outflow of 12,000 af/y (Table 15).

Model results indicate no discharge of water from Boulder Flat to the Humboldt River. Most of the water infiltrated at TS Ranch Reservoir or applied as irrigation discharges from Boulder Flat as increased ET. This is consistent with the estimates by Berger (2000, Table 6) of the increase in Boulder Flat ET from 1989 to 1995. In addition, groundwater outflow from Boulder Flat to the Clovers area likely discharges as ET, rather than to the Humboldt, based on the large Clovers ET estimated by Berger (2000, Table 5).

Comment 6: "Short-term spikes probably occur often due to flushes of flow from the reservoir; high As may correlate with higher flow from the reservoir to the spring area. The discharge concentration in water emanating from the springs should be correlated with the discharge rate and the discharge to the TS Reservoir."

NDEP Response: As noted above in paragraph 3 of the Division response to Comment 3, the mine water is pre-treated prior to introduction into the TS Ranch Reservoir, and therefore does not flush an As load to the groundwater system. In contrast, it has been found that peak As concentrations in the canal water are consistently associated with storm water runoff, rather than TS Ranch Reservoir infiltration rate.

Comment 7: "…the observed infiltration exceeded 1.6 billion gallons in December 2004, but had only been 48 million gallons during September 2004. Because it does not appear to be occurring now, Barrick should commence measuring the discharge from the springs. This is the only way to know whether all of the reservoir infiltration is discharging from these springs or whether it continues to move southwestward through Boulder Flats as the groundwater contours indicate. It would be best to use a flume and a continuous stage recording device to capture the short-term variability in the flow rates. To determine if As concentration corresponds with high flow rates, there should be an automated sampling system used to grab a sample at the peak flow rate."

NDEP Response: As noted above in paragraph 4 of the Division response to Comment 3, Barrick does use a flume-datalogger unit and telemetry system to record flows in the Sand Dune Canal and does daily sampling for As to determine if water treatment is needed. As noted above in the Division response to Comment 6, the observable correlation is between As level and storm water runoff, not TS Ranch Reservoir infiltration.

As noted above in paragraph 1 of the Division response to Comment 3, it is already known that not all of the TS Ranch Reservoir discharge is from the springs and that some of the flow discharges as groundwater directly to the alluvial aquifer. Therefore it is not clear what benefit the additional spring flow monitoring would bring.

Comment 8: "NDEP should require that monitoring wells such as BV-93 be monitored for both water level and profile 1 constituents to track the mound and determine if a plume is moving or has moved to the river. Additional wells downgradient of the infiltration areas should also be added and monitored."

NDEP Response: Given the lack of evidence for such a plume, the search would likely be futile and is not warranted based on a one-time As "hit" at Green Spring.

Comment 9: "The fact sheet indicates water flowing from the springs to canal picks up As; the graphs of spring discharge As concentration and the canal flow As concentration confirm this. This would seem unlikely if the water flowed on the surface. Is there a significant wetland having formed below the springs but above the collection point in which the water would pick up As by groundwater/surface water interchange?"

NDEP Response: The As is picked up on the surface, not from any interaction with groundwater. Flow in the canal is treated for As if necessary, as indicated by daily sampling (see the Division response to Comment 3 above).

Comment 10: "Are there standards for boron; if so, they should be added to the permit."

NDEP Response: No, there are no groundwater standards for boron.

References

Berger, D.L., 2000. Water-Budget Estimates for the 14 Hydrographic Areas in the Middle Humboldt River Basin, North-Central Nevada. U.S. Geological Survey Water-Resources Investigations Report 00-4168.

BLM, April 2000. Cumulative Impact Analysis of Dewatering and Water Management Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project.

BLM, January 2003. Final Supplemental Environmental Impact Statement, Betze Project, Barrick Goldstrike Mines Inc.

Maurer, D.K., R.W. Plume, J.M. Thomas, and A.K. Johnson, 1996. Water Resources and Effects of Changes in Ground-Water Use Along the Carlin Trend, North-Central Nevada. U.S. Geological Survey Water-Resources Investigations Report 96-4134.

McDonald Morrissey Associates, 1998. Regional Hydrologic Model. Consultant report.

Prudic, D.E., R. G. Niswonger, and R.W. Plume, 2004. Trends in Streamflow on the Humboldt River between Elko and Imlay, Nevada, 1950-99. U.S. Geological Survey Water-Resources Investigations Report